INTRODUCTION TO SUPPLY CHAIN MANAGEMENT

Inbound Logistics.....raw materials to the shop floor

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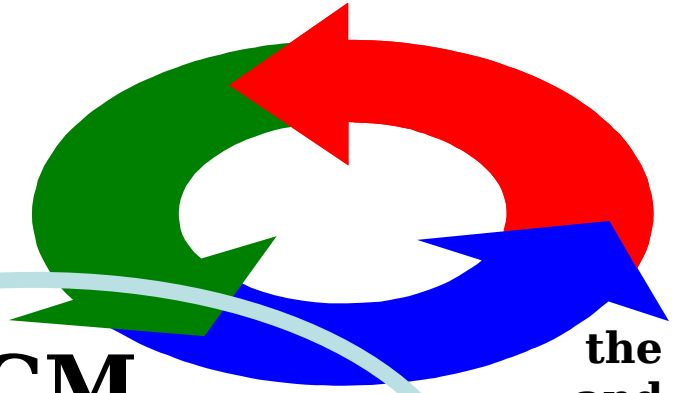
Supply Chain Management

M can be described as part of 3-D concurrent engineering:
oduct-Process-Supply Chain


LEAN
zero waste, max flexibility, max value stream
E-MFG
the use of the Internet and all other electronic means to manage the entire manufacturing enterprise
SCM
all activities associated with the flow and transformation of materials and its related information from source to end user

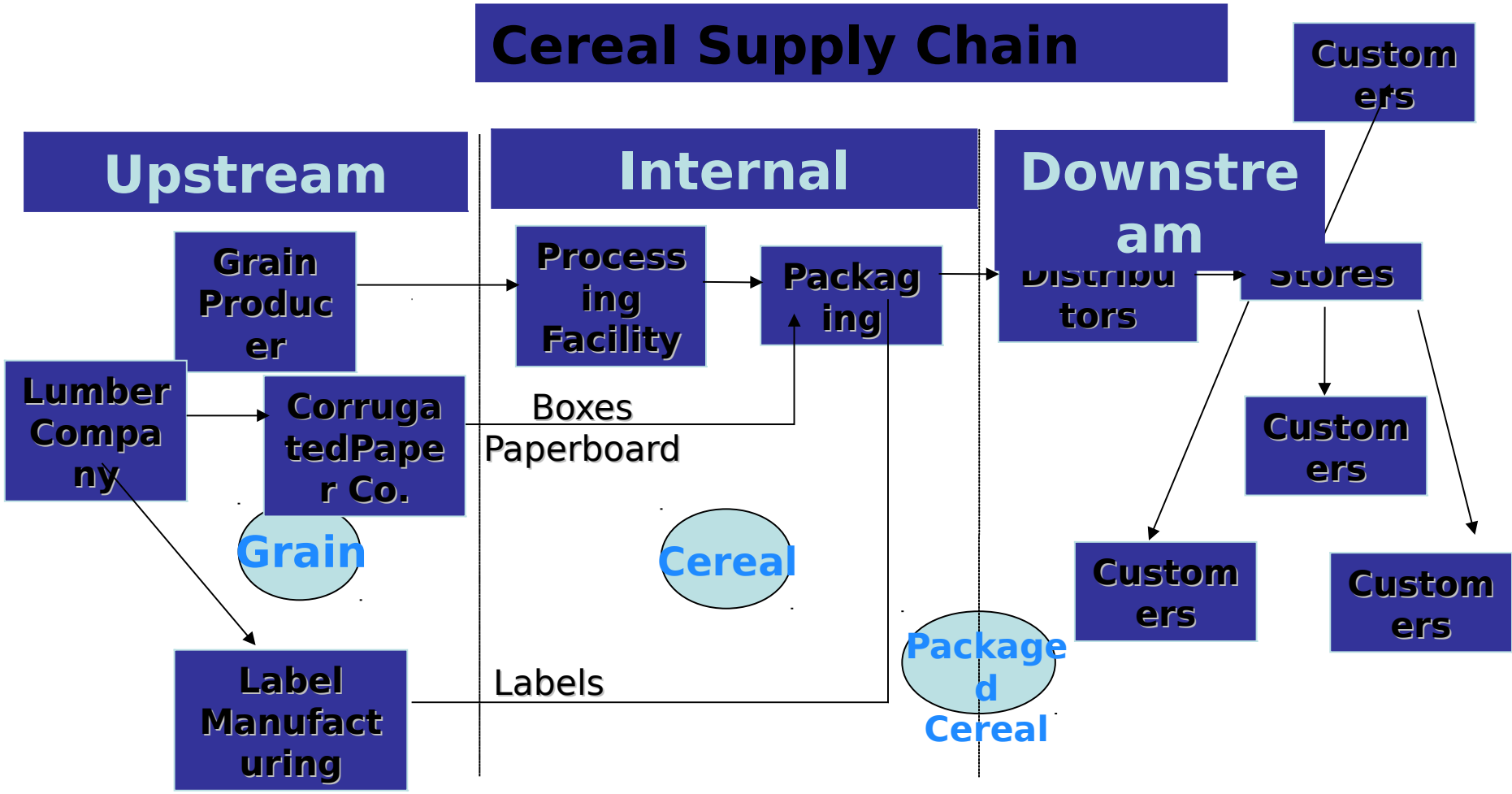
Supply Chain Management

Definitions

• **Supply Chain** – the flow of materials, information, funds and services from raw material suppliers through factories and warehouses to the end customers.

• A supply chain also includes the organizations and processes that create and deliver these products, information, and services to the end customers.

• **Supply Chain Management** – a total systems approach to managing the entire supply chain. The function of Supply Chain Management (SCM) is to plan, organize and coordinate all the supply


Cereal Supply Chain
Upstream
Internal
Downstream
Customers
Grain Producer
Processing Facility
Packaging
Distributors
Stores
Lumber Company
CorrugatedPaper Co.
Boxes
Paperboard
Grain
Cereal
Customers
Customers
Customers
Label Manufacturing
Labels
Packaged Cereal

The Modern Supply Chain Environment

Background:

- **Global competition**
- **More complex products**
- **More diverse product lines**
- **Shortened product lifecycles**
- **Heightened customer expectations**

ms along the Supply Chain:

rtainties:

emand forecast – influenced by competition, prices, weather, tech devel

elivery times – machine failures, road conditions, traffic jams, etc.

uality problems – internal or external

oduction delays – material availability, machine failures, etc.

:

ligh inventory financing and carrying costs, obsolescent material –

orst in class vs. best in class is 3X-4X dollars more

Supply Chain Problem: Materiel is now THE major cost in production: it costs a lot to hold but we also never want to run out! How do we balance?

Traditional Supply Chain Solutions:

- **<u>Vertical integration</u> – purchasing Upstream supply chain tier suppliers in order to control "uncertainty" (i.e. Ford's purchase of rubber for car tires).**

- **<u>Building inventories</u> as "insurance" against supply chain uncertainties**
  - **very difficult to correctly determine inventory levels for each product and part**
  - **if set too high (inventory) = large cost of maintaining a high inventory**
  - **if set too low (inventory) = no insurance against high demand or**

SCM Design

- Product Design; modular or integral
- Make or Buy
- Distribution Network
- Inventory Control
- Contractual relationship w/suppliers
- Supplier coordination and KPIs
- Info Technology and Decision Support Systems

Supplier Selection Criteria

- Past performance & previous experience
- Ability to meet capacity & delivery rqmts
- Financial stability
- Ability to provide technical support
- Adequacy of the quality mgt system
- Estimated total cost of dealing with the supplier

Supplier KPIs

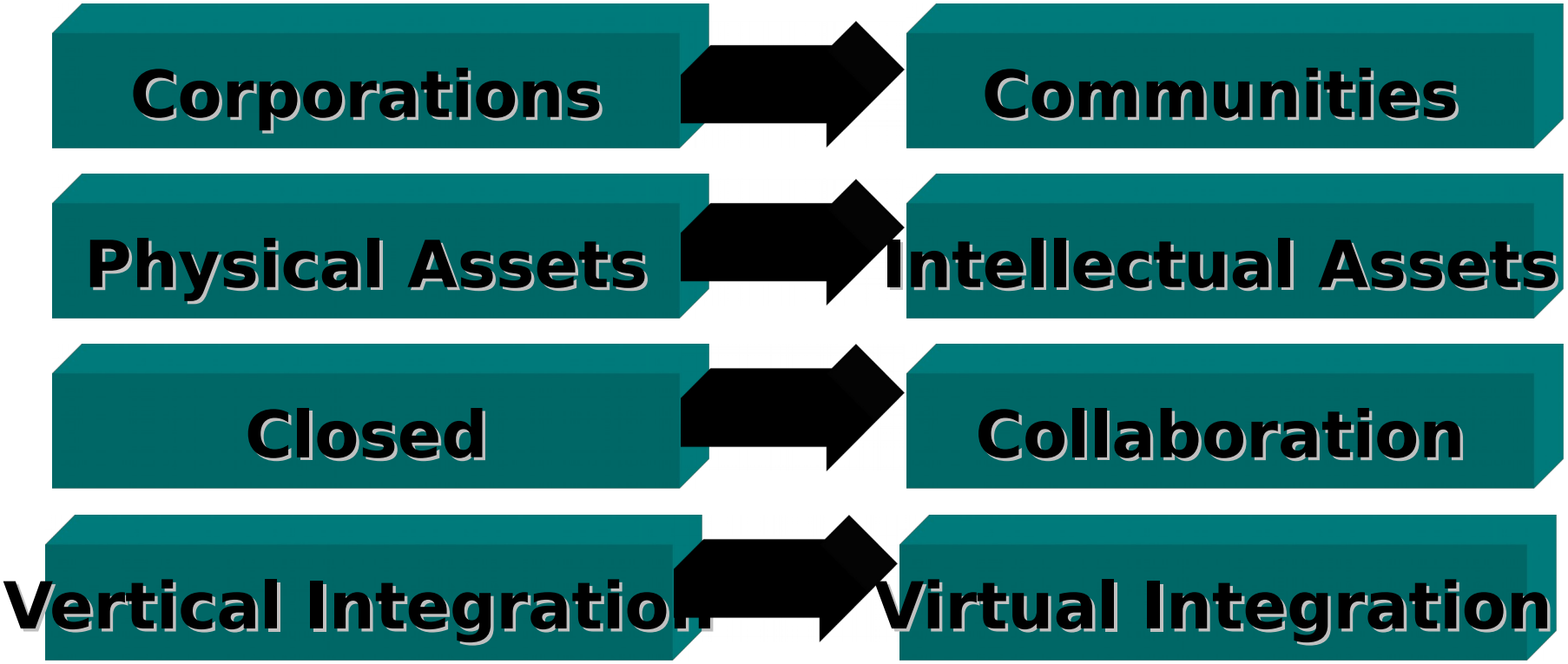
- Quality
- Delivery
- Product cost
- Responsiveness
- Cost due to customer failures, shop floor disruptions and failure at incoming inspection
- Technological leadership

INFORMATION DISTORTION ALONG THE SUPPLY CHAIN

- SELF-OPTIMIZATION & MISTRUST
- LACK OF INFORMATION/WRONG INFO
- DELAY AND DELAY PROPAGATION

The “Bullwhip” Effect

SCM Value Shifts



The New Manufacturing

- Design and integration only – perhaps some assembly
- Contract Manufacturers – build-to-print
- Third-party logistics providers

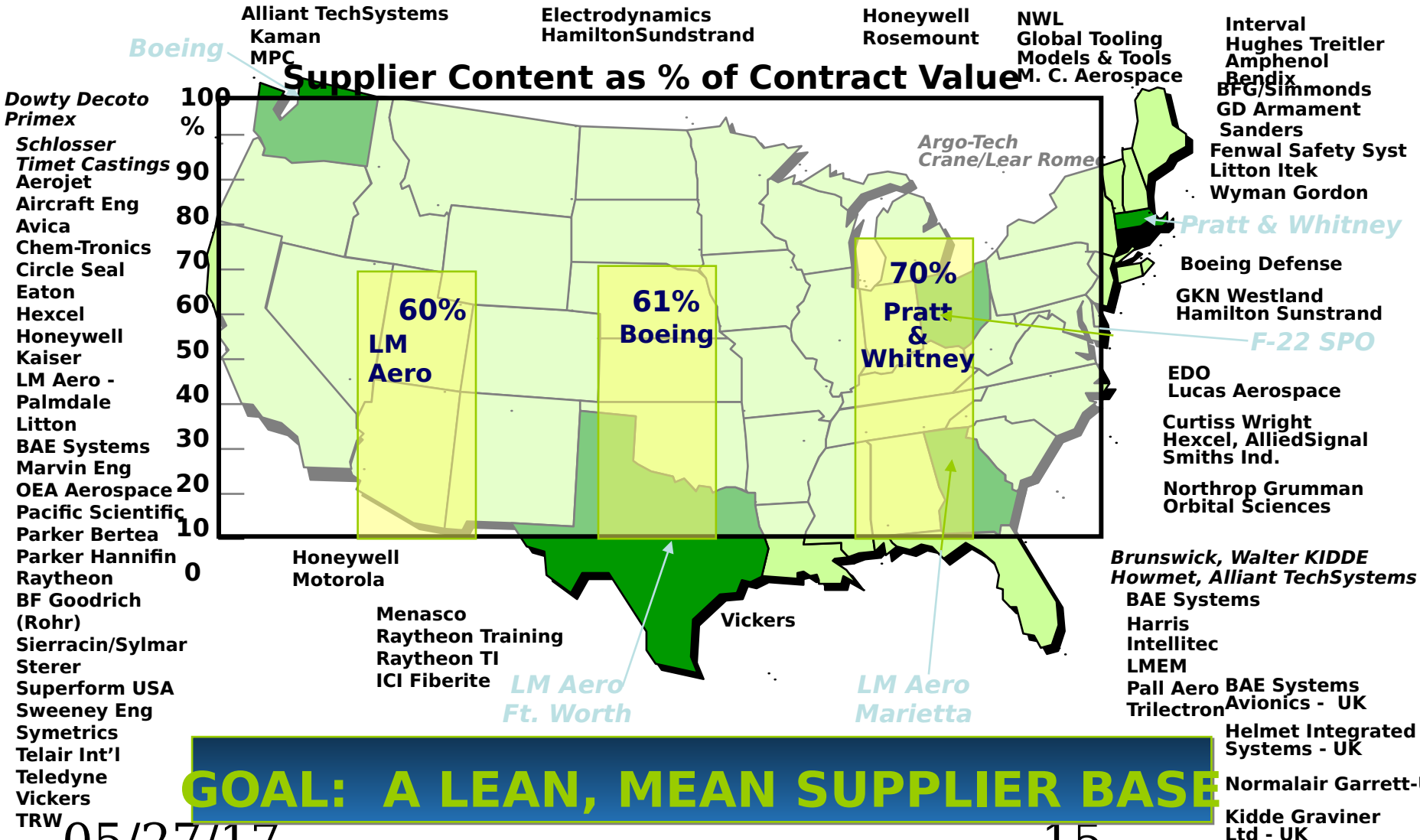
THE RISE OF DISPERSED MFG
"Low-Cost Country" Sourcing

- More modern factories in low-cost areas
- Reduction of trade barriers
- Some factories are emerging as global leaders in certain technologies

SCM TRENDS

- EXPECT OUTSOURCING TO INCREASE FOR ALL PRODUCTS
- PRIMES INCREASINGLY FOCUSED ON DESIGN AND INTEGRATION
- 90% - 100% OUTSOURCED WILL NOT BE UNUSUAL IN THE FUTURE

F-22 SUPPLIERS



GOAL: A LEAN, MEAN SUPPLIER BASE

SCM TRENDS

- **ASSEMBLY BECOMING A COMMODITY**
- **SCM BECOMING A STRATEGIC FACTOR**

  SCs MUST FUNCTION LIKE A SINGLE ENTITY
- **ELECTRONICS LEADS ALL OTHER MFG SECTORS IN THE OUTSOURCING OF FAB AND ASSY**
- **IS SCM THE ULTIMATE CORE COMPETENCY?**
- **SC MANAGEMENT TO <u>SUPPLIER</u> MGT?**

BOEING 787

- Modular design
- Design work in US, Japan, China, Russia
- Fabrication all in Japan, France and Italy except for nose, cockpit and vertical stab.
- Air transport vice sea
- Contracting councils for each module

IMPROVING SC PERFORMANCE

- **DESIGN FOR PRODUCIBILITY,MODULARITY, STANDARDIZATION, COMMONALITY, AND POSTPONEMENT**
- **“SHORTEN THE CHAIN”: FEWER STRATEGIC PARTNERS W/ WORLD CLASS QUALITY AND DELIVERY**

ADDING INTELLIGENCE and End-to-End VISIBILITY OF THE CHAIN:

- **TECHNOLOGY: WWW B2B, integrated ERP**
- **BETTER DEMAND FORECASTS: ”all forecasts are wrong”**
  - hybrid inventory control: MRPII + JIT
  - order long-lead materials/components based on demand forecasts and econometric models

SCM ISSUES

- **A capable prime means little if its supply chain has quality and delivery issues**
- Are there risks in a global supply chain?
- Is the government losing insight into its primes' SCs? Does it matter?
- Does your prime have management and technical processes to manage its supply chain?
- These are issues we have not faced before on this scale
- Use your DCMA resources

The Effects of 9/11

- Alternate sourcing arrangements formalized
- Formalized transportation alternatives
- More sophisticated logistics/ERP software to know where materials are at any time
- Inventory levels being increased by 10% to 15%
- Parts being ordered earlier, more lead times being built into production schedules

Top Ten SC Managers per AMR Research 2004

1. Dell
2. Nokia
3. Proctor & Gamble
4. IBM
5. Wal-Mart
6. Toyota Motor
7. Johnson & Johnson
8. Johnson Controls
9. Tesco
10. PepsiCo